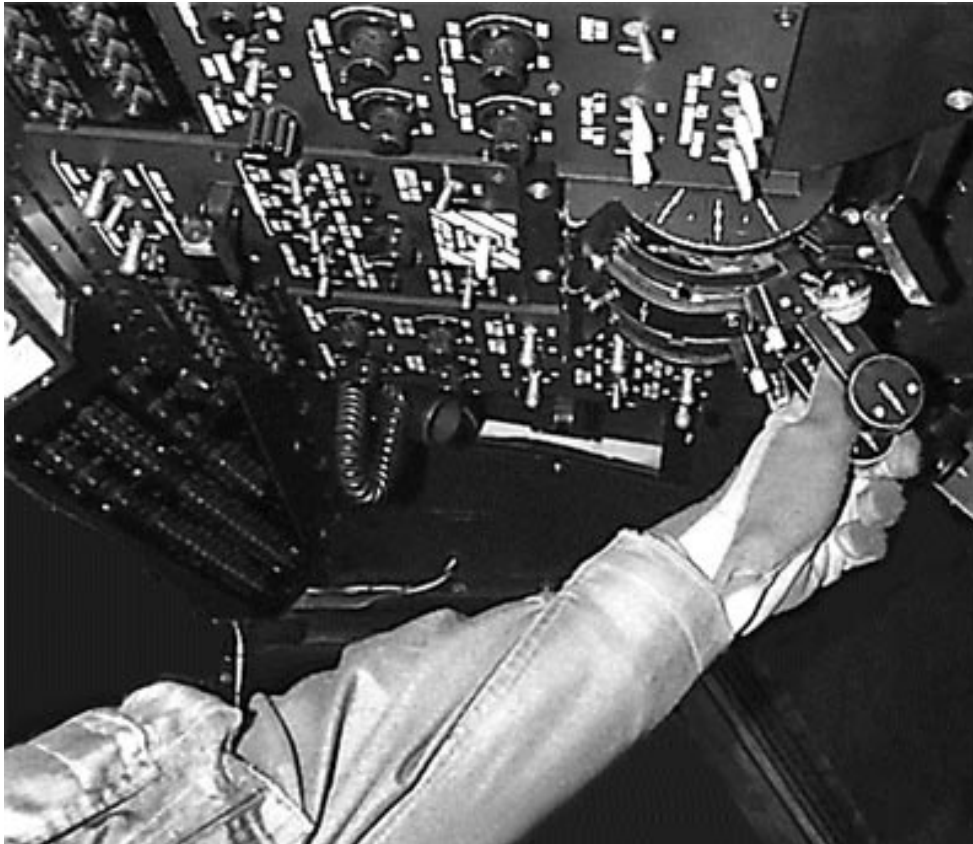


Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

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***They
SHUT
DOWN
the WRONG ENGINE!***

On a clear night, two UH-60s were flying over water along a coastline. About 15 minutes into the flight, the crew of the trail aircraft radioed Chalk 1: "Hey, guys, your number-two engine is on fire!" They received no reply, but they watched as Chalk 1 immediately turned toward shore. Shortly thereafter, descending at 1200 feet per minute, Chalk 1 hit the water at 214 knots, appeared to explode, and sank. All four crewmembers died instantly. This tragedy was the result of the crew's mistaken reaction to a single-engine emergency: gas-generator turbine failure on the No. 2 engine. Their mistake?

Why?

As a result of this accident, the U.S. Army Aeromedical Research Laboratory (USAARL) undertook a study to determine whether pilots' reactions to single-engine emergencies in dual-engine aircraft are a systemic problem and whether the risks of such actions can be reduced. The goal of what has become popularly referred to as "The Wrong-Engine Study" was to examine errors that trigger pilots to shut down the wrong engine during such emergencies.

A two-part study was used to determine the extent and possible causes of errors made in response to single-engine emergencies.

Part I: Field survey

USAARL and the Army Safety Center jointly developed a survey that would determine how often the errors of interest occurred but were detected and corrected before they caused an accident. The survey was mailed to all brigade safety officers and medevac units down to company level with instructions to distribute copies to all dual-engine aviators. Participation in the survey was voluntary.

Of a target population of about 4100 aviators, at least 350 responses were required for a reliable sample. Nearly twice that many—676—were

returned, all of which were included in the analysis. Two questions yielded particularly important insight into the problem:

- Do you believe there is a potential problem of shutting down the operating engine during a single-engine failure/malfunction?
- Have you ever moved or started to move the wrong power-control lever during a simulated or actual emergency?

Just over 70 percent of the pilots surveyed believe there is a potential problem of shutting down the operating engine in a single-engine emergency. In response to the second question, 39 percent affirmed that they had confused the power-control levers during simulated or actual emergencies. Nearly half of those (18% of the total) had actually shut down the "good" engine or moved the power-control lever.

The survey also asked pilots who had experienced confusion with the power-control levers to indicate what caused them to move the wrong lever. Nearly half of these aviators (111 of 224) indicated that their action was preceded by an improper diagnosis of aircraft condition. Other reasons given included design of the PCL (13), design of the aircraft (19), use of NVGs (10), inadequate training (34), negative habit transfer (10), hurrying (23), and inadequate written procedures (4).

As to the question of how to prevent aviators from shutting down the wrong engine, 75 percent of those responding recommended training solutions, while the other 25 percent recommended engineering fixes. Recommendations with a response frequency greater than five are shown in table 1.

Part II: Flight-simulator study

Flight simulation was used to observe pilots in artificial emergency situations. Resulting data helped identify procedural and design modifications that could help reduce the risk of shutting down the wrong engine during single-engine emergencies.

The only inclusion criterion for the simulator study was that all subjects must be qualified in the UH-60. Informed consent was not required as the experiment involved "normal training or other military duties as part of an experiment wherein disclosure of experimental conditions to participating personnel would reveal the artificial nature of such conditions and defeat the purpose of the investigation" (USAMRDC Reg 70-25).

Initial estimates called for 500 aviators (250 two-pilot crews). However, due to normally scheduled training, some aviators were observed on more than one occasion. Altogether, the 272 two-pilot crews observed included about 450 aviators.

There was no direct interaction with the

Table 1. Aviator recommendations

<i>Training</i>	
■ Improve Aircrew Coordination Training	(129)
■ Increase requirement for emergency-procedures training in simulator	(96)
■ Increase individual-proficiency training	(79)
■ Increase malfunction-analysis training	(29)
■ Changes to -10	(11)
■ More detailed systems knowledge	(11)
<i>PCL design</i>	
■ Label and illuminate	(80)
■ Change spacing/angle	(25)
■ Shape code knobs	(15)
<i>Aircraft design</i>	
■ Master warning lighting	(15)
■ Electric stop based on engine parameters	(8)
■ PCL audio "1" or "2"	(5)
<i>Behavior</i>	
■ Slow down; stop hurrying	(80)
■ Think	(27)
■ Don't touch PCLs for single-engine emergencies	(22)

subjects nor interference with their normal training. Subjects were briefed as usual by a rated aviator (usually the simulator operator or instructor pilot) on the mission profile to be flown and were required to conduct all preflight planning. Following the preflight briefing, the subjects entered the simulator and completed a 2-hour training flight. During the flight, the simulator operator exposed the crew to at least one of six randomly assigned conditions (engine fire, engine failure, high speed shaft failure, compressor stall, or torque split high and low side failures) that called for employment of single-engine emergency procedures. In addition, a failure presenting false indications of engine failure (an engine-out light and audio warnings associated with an alternator failure) were assigned at random to some subjects. Subjects' reactions to these conditions subsequently were analyzed to examine their information-processing and decision-making skills under simulated emergency conditions.

Results were that 15 percent of the participants in the simulator study reacted erroneously to the selected emergency procedures. One out of four of those erroneous reactions resulted in dual-engine power loss and simulated fatalities. Analysis of pilot reactions to indications of engine failure points to problems with the initial diagnosis of a malfunction (22 of 47) and errors in actions to correct the problem (15 of 47). Other errors included failure to detect cues arising from changes in the system (3), failure to choose a reasonable goal given the circumstances (for example, try to get home vs. land immediately) (2), and failure to execute proper procedures (5). The severity of these errors ranged from immediately realizing and correcting the mistake with no impact to actually shutting down the "good" engine, resulting in loss of the aircraft.

Conclusions

The bottom line is that malfunctions that call for employment of single-engine emergency procedures are relatively rare events. However, such situations produce a one-in-six chance that the pilot will respond incorrectly to the emergency.

The study identified training measures to reduce this identified risk. In his 7 March 1997 message to aviation commanders, the Aviation Branch Chief outlined actions the Army Aviation Center (USAAVNC) has taken to implement these recommended changes in the training arena:

- **Increase aircrew coordination training.**

USAAVNC is rewriting affected ATMs to ensure they adequately cover all single-engine failures and malfunctions and more strongly emphasize crew coordination.

- **Expand school training on correct engine malfunction analysis and emergency procedures.**

During academic portions of courses at USAAVNC, the GG-rotor problem is highlighted during the engine systems class and engine malfunction analysis class. In flight phases, the GG-rotor problem is addressed during the contact phase of training. Engine malfunction analysis is stressed, and the "two-pilot" mentality and crew coordination are emphasized.

- **Increase simulator training with emphasis on malfunction analysis and emergency procedures to include all engine malfunctions associated with single-engine failures.** In the simulation phases of courses at USAAVNC, engine malfunction analysis is stressed, emphasizing correct identification and crew coordination before pilot action. In addition, iterations of engine malfunctions have been increased.

- **Revise -10 and checklist emergency procedures to remove ambiguity and stress control of the aircraft and time allowed for reaction.** USAAVNC reviewed emergency procedures in all multi-engine helicopter operators manuals to ensure compliance with GG-rotor messages and "Wrong-Engine Study" recommendations. Changes to UH-60 and AH-64 operators manuals will be fielded as manual revisions within 90 days. Several of the changes will emphasize that the most important single consideration is helicopter control and that all procedures are subordinate to this requirement.

- **Increase individual aviator proficiency training.** The Aviation Branch Chief requested the assistance of field commanders in this area: "Although we have applied risk-control measures to our manuals and to the way we train in the schoolhouse, I need your help in increasing individual proficiency training. The AH-64 combat mission simulator and the UH-60 flight simulator are cost-effective platforms to conduct the application and correlation levels of learning. During each simulator period, recommend you conduct at least one iteration of all engine malfunctions associated with single-engine failures, with emphasis on helicopter control, correct identification of engine malfunctions, and emergency procedures and crew coordination. The Division of Evaluation and Standardization will continue to emphasize performance planning, crew coordination, risk analysis, and single-engine emergency procedures on all field evaluation and assistance visits."

In addition to these training measures, further research is being conducted to identify possible engineering changes that could reduce the risk of pilots reacting improperly to single-engine emergencies in multi-engine aircraft.

—CPT Robert M. Wildzunus, Ph.D., USAARL, Fort Rucker, AL, DSN 558-6879 (334-255-6879)

NOTE: UH-60 GG-rotor work was completed on 17 March 1997. The Black Hawk PM is working with the Apache PM to assist with the AH-64 GG-rotor program. The UH-60 POC is Mr. Dave Lizotte, 314-263-0485; AH-64 POC is Mr. Bill Reese, 314-263-6794.

Update of Brigade ASO Conference issues

What follows is an update on the status of issues discussed during the January 1997 Aviation Brigade Safety Officer Conference held at Fort Rucker. Watch for future updates in *Flightfax*, on ASOLIST, and on the USASC Bulletin Board. POCs for questions or comments are CW5 Bob Williams at the Aviation Branch Safety Office, DSN 558-3000 (334-255-3000), and CW4 Lee Helbig at the Army Safety Center, DSN 558-2381 (334-255-2381).

Issue 1: Standardized procedures for joint/multinational (combined) operations. FORSCOM has the lead on developing a standardized SOP for joint/multinational operations. At the Army level, FM 100-5 provides standard doctrine for both joint and combined operations. TRADOC has proponentcy for integration of risk management into FM 100-5. At the Aviation Branch level, standardized doctrine for joint/multinational operations is in FM 1-100: *Aviation Operations* and 100-series TTP manuals. The USAAVNC Directorate of Doctrine, Training, and Simulation (DOTDS), in concert with the Aviation Branch Safety Office (ABSO), has the lead for integrating risk management into aviation FMs.

Issue 2: Development of exportable risk-management training and status of aviation safety NCO qualification training. The Army Safety Center has developed two training support packages (TSPs) for risk management. Available today is the TSP for leaders at company and platoon level. Very soon, a TSP for battalion and brigade commanders and staff will be available. Although currently in hard copy only, the intent is to provide the TSPs on CD and through the USASC Bulletin Board. Aviation safety NCO qualification training has been curtailed by the Safety Center due to funding constraints. The Army Safety Center is working with the Aviation Branch to incorporate aviation-specific NCO safety tasks into aviation NCOES.

Issue 3: Status of AR 385-95. The Commanding General of the Army Safety Center has approved the fielding of AR 385-95 as a separate regulation. A working group consisting of USASC and USAAVNC personnel are updating the 1995 draft and expect to have a staffing document completed by the end of FY 97. The new AR focuses on integrating the risk-management process into aviation command, staff, and unit functions, eliminating requirements proven to be of little value to accident prevention, and expanding guidance on management of a unit aviation safety program. Expect this new AR to clear up several issues discussed during the Conference, including—

- Clarification of the ASO/commander relationship.
- Added emphasis on continuing education for ASOs.
- Expanded crew-endurance guidance based on USAARL studies.
- The requirement for a Commander's Accident Prevention Plan.
- Clarification of requirements for Reserve Component units/facilities.

Issue 4: Changes to DODI accident-classification criteria. There is no current DA initiative to change the DODI criteria.

Issue 5: Consolidation of aviation regulations/publications onto CD ROM. The USAAVNC DOTDS has the lead on this issue. Within the next 2 years, all new aviation doctrinal publications will be available on CD ROM and on the Fort Rucker Home Page (<http://www-rucker.army.mil>). Currently, many aviation doctrinal publications can be accessed in the

Army Digital Library through the Army Home Page (<http://www.army.mil>).

Issue 6: Electrical grounding and bonding procedures differ among MACOMs. This issue exists because the proponent of FM 10-68 proposed changes that some MACOMs acted on and some did not. The new FM 10-67-1, which should be fielded by September 1997, will supersede FM 10-68 and clarify the requirements for grounding and bonding aircraft and refueling vehicles. Until the new FM is fielded, comply with your MACOM's interim directives or FM 10-68 as applicable.

Issue 7: Protection of aircraft crash sites from hazardous materiel. The current DA Pam 385-40 (para 2-2b(2)) addresses the need for preaccident plans to provide procedures to protect personnel from hazardous materiel.

Issue 8: 12th Edition Guide to Aviation Resources Management vs. a DA-level checklist. The development of a DA-level checklist for aviation accident prevention surveys has been declined by the USAAVNC Directorate of Evaluation and Standardization (DES). Therefore, the ABSO will update the "Guide" and field it in FY 98 as the 13th Edition.

Issue 9: The effect of elimination of MIL STD 980 on aviation unit FOD-prevention programs. Unit FOD-prevention programs are not affected by elimination of this MIL STD. Aviation unit FOD-prevention programs are as specified in AR 385-95.

Issue 10: All aviation intermediate maintenance (AVIM) units do not have TOE positions for a qualified ASO. One of the successes of the Aviation Restructure Initiative was a change to place a qualified ASO on the TOE of AVIM units not having a parent aviation headquarters. The "bill-payer" for this adjustment was an O-3 position in the old TOEs. During the Conference, a question arose pertaining to the Theater AVIM company in Korea. No ASO position exists on their TOE. Further research shows that this unit is forward deployed away from their parent battalion, which does have a TOE position for an ASO. This case requires that the command request an exception and adjustment to the unit MTOE.

Issue 11: HAZCOM requirements for U.S. Army units. HAZCOM programs are conducted IAW DODI 6050.5. The Army Safety Center commander published message 251431Z Oct 95 to clarify the Army position. AR 385-10 and AR 40-5 implement all DA labor standards, including HAZCOM. Recordkeeping and training are MACOM functions. USASC POC: MAJ Wallace, DSN 558-1122 (334-255-1122).

Issue 12: What is the DA position on the TRIMAX fire-suppression system? DA does not endorse any one manufacturer of fire-suppression systems. However, the compressed air/foam (CAF) fire-suppression system has been evaluated by ABSO, USASC, and many field units with favorable results. The DA Fire Prevention and Protection Office is currently developing a position on the CAF system for aviation use.

(continued on page 9)

Issue 13: The ASO community needs electronic access to safety-of-use (SOU) messages, safety-of-flight (SOF) messages, and Aviation Safety Action Messages (ASAMs).

ASOs are required to monitor the SOU/SOF/ASAM program, which is managed by the Aviation Maintenance Officer (AR 385-95). ASOs should ensure that they are on the local distribution list for these messages. ASOs can also electronically receive *unofficial* SOU/SOF/ASAMs through the ASOLIST. These messages are archived on the USASC Bulletin Board System.

Issue 14: The time requirement for reporting Class C through E mishaps is too short. The next change to AR 385-40 will expand the time requirements.

Issue 15: Reporting requirements for "common" materiel failures, such as the CH-47 clamshell, need to be modified.

The Army Safety Center sees no need to modify current reporting requirements. It is important that all materiel-failure mishaps be reported in order to correct "common" materiel deficiencies.

Issue 16: Units need an additional ASO. Although it's always nice to have additional personnel, the ABSO does not see this as a critical need. Most units function very well with one qualified ASO managing the program for the commander. Additionally, creating a position for a second ASO would require elimination of some other position. It is doubtful that most commanders would agree to this.

Issue 17: Safety awards should be recorded on DA Form 759 (Flight Record). TC 1-210 requires that safety awards be recorded on DA Form 7122-R in the Individual Aircrew Training Folder. This permanent document provides a sufficient record of safety awards and should be readily available for the ASO to review.

Issue 18: There needs to be more DA emphasis on OH-58D hot starts. This issue is being worked in more than one direction. There is discussion covering the two batteries, and some discussion exists covering training.

Issue 19: Requirements for closing flight records in the event of an accident should be more specific and regulatory. FM 1-300's requirement to close the flight record at the direction of the president of the accident-investigation board is sufficient. The reason for closing flight records in the event of an accident is to obtain information necessary to complete the accident report. If data is not needed by the board president, there is no need to close the record. Provisions exist in FM 1-300 for local commands having other reasons to close records.

Issue 20: Why does it take so long to publish or change a safety regulation? The current system of safety regulations is under DA-level review. The Army Safety Center is pursuing an initiative to reduce the total number of regulations. This initiative has caused a delay in publication of safety regulations while decisions are made at senior-Army-leader level.

Issue 21: How can we focus on risk management and still meet regulatory and statutory requirements? Regulatory and statutory requirements, as well as local policies and procedures, are an integral part of the risk-management process. Such requirements should be considered controls to reduce risk and must be evaluated for their effect on the mission. As with any control, the residual risk that exists

when the control is or is not applied (or complied with) must be accepted by the appropriate authority. Your commander may or may not have the authority to accept the risk associated with waiving a regulatory or statutory requirement, but, if a waiver is justifiable through risk management, it should be requested from the appropriate authority.

Issue 22: Unit evaluations should include a dynamic process of observation of performance. The ABSO and USASC agree strongly that internal safety evaluations are most effective if actual task and behavior performance can be evaluated. Unit ASOs should focus surveys on observing both individuals and units in actual mission performance. Unfortunately, external safety evaluations usually have the opposite of the desired effect. When someone from outside the unit is observing performance, it is usually considered by the local command to be distracting and disruptive of the mission. Both DES and the ABSO, along with several MACOMs, have attempted this "dynamic" process with little success. Additionally, external evaluators are usually severely limited by time and must evaluate as much as possible as quickly as possible. Because of this, external evaluations will most likely continue to focus on how programs are being managed, which lends itself to the static process of records review and questions and answers, with a minimum of task and mission observation.

Issue 23: There is no TACOM requirement to report completion of Army motor vehicle (AMV) modification work orders (MWOs) or SOU message directives. MWOs applied to vehicles are reported through channels to the Program Manager of the system, not to TACOM.

Issue 24: Use of "noncrashworthy" fuel pods for CH-47 "FAT-COW" operations presents a high risk. The ABSO is working with the Directorate of Combat Developments to reassess the risks of using 600-gallon fuel pods for "FAT-COW" operations.

Issue 25: Many units are not in compliance with AMV driver-training requirements. AR 600-55 and AR 385-55 refer trainers to TC 21-305-100 and series for training drivers. These ARs are under revision and will become one regulation. Units must use the training circulars to ensure quality training. The Army commercial drivers license program is available on CD ROM (CAI 551-10: *The 88M Army Motor Transport Unit and Operations Multimedia Interactive Library*). USASC POC is Mr. Don Wren, DSN 558-9864 (334-255-9864).

Issue 26: The aviation community wants Aviation Digest back. The *Aviation Digest* is a victim of Fort Rucker's reduced budget. No funding is currently available for a Branch periodical and none is planned for the future.

Issue 27: OERs should reflect risk management/safety performance. AR 385-10, paragraph 1-5f, currently requires this.

Issue 28: AR 385-95 requirements for semiannual surveys and quarterly safety councils should be reevaluated for Reserve Component units. These requirements have been evaluated and coordinated with the NGB and USARC safety offices. Frequency requirements will not change with the new AR. However, guidance on what is expected from the surveys and councils will be expanded, which should help program management.

Accident briefs

Information based on preliminary reports of aircraft accidents

AH1



Class E

F series

■ Alternator came off line as N2 began descending below 91 percent upon entering simulated engine failure. Suspecting inverter failure, IP opened throttle and engine rpm was regained. Maneuver was terminated to a hover, and SCAS was reengaged. Crew chief opened battery compartment while aircraft was at flight idle and saw the inverter smoking. Aircraft was shut down and inverter was replaced.

AH64



Class C

A series

■ APU start was attempted during ground taxi to parking. Crew heard loud humming noise from rear of aircraft, and master caution and fire APU lights came on. PI pulled APU fire handle, activated the primary fire bottle, and shut down the APU. Fire light went out, and crew performed emergency shutdown. Investigation revealed damage to APU, PTO clutch assembly, and APU drive shaft. Caused by failure of PTO duplex bearing.

Class E

A series

■ During approach, No. 2 engine experienced compressor stall, high tgt, popping sound, and low torque. Pilot reduced collective and stall ceased. Aircraft landed without further incident. Maintenance replaced the turbine rotor (GG rotor) assembly.

■ No. 2 generator caution light came on during ground run taxi from parking. Caution light remained on despite attempt to reset No. 2 generator. Aircraft was ground taxied back to parking and shut down. Maintenance replaced No. 2 generator.

■ During ground taxi to refuel, utility hydraulic pressure indicator confirmed total loss of utility hydraulics system. Crew immediately returned aircraft to parking and shut it down. Maintenance replaced ruptured hydraulic pressure hose.

CH47



Class A

D series

■ Aircraft was in cruise flight at 1100 feet agl and 135 KIAS when it experienced an uncommanded nose-down pitch and left roll. Aircraft became inverted, then righted itself. Crew was able to decelerate just prior to ground contact, and aircraft touched down upright at near-zero airspeed. Observer suffered minor injury; the other three crewmembers were uninjured. Aircraft sustained extensive engine, transmission, and drive-train damage; the airframe, however, remained intact. Investigation continues.

Class C

D series

■ Copilot's jettisonable door separated from aircraft during cruise flight at 3500 feet msl and 150 KIAS.

■ During final approach for landing at night, CE inadvertently pressed cargo-hook release button, unintentionally jettisoning a 1¼-ton truck.

■ During engine health indicator check, aircraft experienced engine overspeed (118%).

Class D

D series

■ Left aft pylon work platform separated at some point during flight at night. Suspect latch assembly failure.

Class E

D series

■ During approach, aircraft developed unusual shaking and oscillating condition prior to airspeeds associated with effective translational lift. Suspecting the rotor system had developed an out-of-balance condition, the PC took the controls and landed. Inspection revealed that aft rotor head assembly, yellow blade, and horizontal hinge pin had seized. Head assembly was replaced.

■ During rapid refueling, flight engineer noticed fuel port dripping fuel. Aircraft was shut down. Maintenance replaced O-ring in external refuel port.

■ While on ground, CP smelled hydraulic fluid. Inspection revealed

hydraulic fluid was spraying inside front pylon and leaking down side of aircraft. Caused by hole in fluid line of No. 1 flight control module.

OH58



Class B

D series

■ Crew heard thud during low-level multi-ship training flight at night and made precautionary landing. Inspection revealed three damaged main rotor blades and missing components (laser designator and shroud to mast-mounted sight). Local investigation board was convened.

Class E

D series

■ During hover at 50 feet agl, low engine oil quantity caution light came on. Inspection revealed no oil in tank but no visible leaks. Further inspection revealed oil in freewheeling unit because scavenge pump was unable to pump oil back to engine. Caused by overservicing the engine oil.

■ Aircraft was started with exhaust pillow installed. Engine combustion blew smoldering pillow to rear and clear of aircraft. Aircraft was not damaged, but pillow reportedly was toasted.

■ During start sequence tgt appeared to rise normally. Right-seater glanced down momentarily to check oil pressure, then looked up to see tgt shoot up to 943°C. He completed appropriate emergency procedure. Maintenance completed hot-end inspection and released aircraft for flight.

■ Aircraft lost all instrument lighting during flight at night, and pilot smelled smoke. Aircraft landed and maintenance replaced inverter.

UH1



Class B

H series

■ Engine rpm increased and rotor rpm decreased in cruise flight. Crew autorotated into swamp area, and aircraft rolled over after touchdown. Crew sustained minor injuries.

Class E

H series

■ Master caution and engine chip segment lights came on during engine start. Inspection revealed excessive metal chips on detector. Engine was replaced.

■ At 300 feet agl during approach to landing at night, PI noticed right tail-rotor pedal not responding to pressure. When PI applied extra pressure, control broke loose and pedals responded. PC took controls for landing. Just before touchdown, right pedal stuck again. PC successfully completed a run-on landing. Maintenance towed aircraft to hangar and replaced mag brake.

V series

■ Transmission chip detector light came on during engine runup. Aircraft was shut down without incident. Maintenance replaced transmission because size of metal chips exceeded TM specs.

■ After entry into simulated engine failure at altitude, rotor and N2 needles did not split. Throttle was rolled on and aircraft landed. Caused by input quill failure.

UH60



Class C

A series

■ During final phase of blowing-snow approach, PI applied excessive aft cyclic, and main rotor blades contacted intermediate drive shaft cover. Neither IP nor PI noticed anything unusual. En route to attempt pinnacle approach, IP noticed lateral vibrations and flew aircraft to home station. Postflight inspection revealed damage to tip cap and intermediate drive shaft cover.

L series

■ PI prematurely released load during slingload operations. M119 weapon system fell from approximately 5 feet agl and sustained Class C damage. The aircraft was not damaged.

■ Main rotor blades contacted tree during confined area operations. All four tip caps were damaged.

Class D

L series

■ During an NVG external load hookup of an M119 howitzer, Chalk 5 in a flight of 7 drifted after securing the load but prior to lifting it off the ground. The M119 rolled onto its left rear, coming to rest

upside down. The gun sight mount was damaged.

■ During runup crew noticed crack in left windshield. Orange glow was also noticed in upper left corner of windshield. When crew checked position of anti-ice switches, they found left switch on. Suspect switch was inadvertently turned on while taking No. 2 engine fuel selector to crossfeed for engine runup.

Class E

A series

■ During cruise flight, pilot observed No. 2 engine intermittently reaching overspeed limits. Aircraft landed without incident. Maintenance found No. 2 engine ECU cannon plug loose.

■ During maintenance test flight, left cargo door's front window remote-control lever broke. Window then fell away from the aircraft.

L series

■ Postflight inspection after cross-country training flight revealed that APU access door had separated from the aircraft. The forward hinge showed evidence of twisting, and there was superficial damage to the surface of the No. 1 harness exhaust fairing.

■ During NVG cruise flight, aircraft was struck by bird in vicinity of No. 1 engine. Aircraft returned to home station, where maintenance flushed and bore-scoped engine. No damage was found.

■ During NVG training mission, 15-percent torque split developed between engines, and engine and rotor rpm surged from 100 to 105 percent. Both malfunctions were intermittent. Maintenance test pilot discovered that power-available spindle had been improperly rigged. Adjustment was made to push-pull cables that connect to quadrant levers.

■ Pilot detected abnormal flight control inputs during cruise flight and made precautionary landing. Caused by malfunction of roll trim actuator.

C12



Class A

N series

■ Aircraft crashed at high rate of descent into dry marsh area about 300 yards from ocean waters. It had been on a training mission involving upper-air work. Both crewmembers were killed. Accident is under investigation.

Class B

C series

■ Aircraft was descending on an instrument approach when it encountered icing. Residual ice was reported despite proper use of de-icing equipment. Crew then encountered VMC and configured aircraft for normal VMC landing. About 30 feet above the runway, airspeed decayed and sink rate increased. Power was applied without success, and aircraft descended vertically from 10 feet, resulting in hard landing.

Class C

G series

■ During cruise flight, crew saw bright flash out left window. Suspecting a lightning strike, crew returned to home station without incident. Postflight inspection revealed damage to No. 1 (left) engine propeller, No. 1 engine magnetized gears, and left and right tip antennas.

Class E

C series

■ Crew attempted to taxi aircraft with prop in feather, resulting in engine overtorque.

F series

■ During braking on single-engine landing, left outer main tire failed. Tower reported seeing smoke from left main landing gear during landing rollout. Pilot taxied to parking without further incident. Postflight revealed left outer main tire was flat, with tread worn through 4 layers of cord.

05



Class E

DHC-7

■ During cruise, right hydraulic quantity went to maximum, and pressure began fluctuating. System then lost all pressure, and gear was manually pumped down. At this point, outboard spoilers and half the rudder had failed. Caused by ruptured high-pressure hydraulic line.

■ No. 1 engine would not develop required torque during takeoff roll. Caused by failure of fuel control unit.

■ Nose wheel steering failed during taxi. Caused by failure of power-steering actuator.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-1-97-ASAM-03, 281430Z Apr 97, maintenance mandatory.

Some units have been using TB 1-1500-341-01 as authority to use the UH-1 K-flex drive shaft on AH-1 aircraft. The only authorized K-flex drive shaft for use on the AH-1 is listed in TM 55-1520-236-23P or TM 55-1520-234-23P. The purpose of this message is to direct a one-time inspection of all AH-1 series aircraft to confirm the correct K-flex drive shaft assembly is installed and replace incorrect drive shaft assemblies with the correct one. ATCOM contact: Mr. Howard Chilton, DSN 693-1587/2178 (314-263-1587/2178).

AH-64-97-ASAM-05, 241546Z Apr 97, operational.

On 26 October 1996, a failure of the embedded global positioning system inertial navigation system (EGI) on an AH-64A occurred without notification to the flight crew. This failure caused inertial flight data and associated symbology to

freeze in the last valid state. The purpose of this message is to alert AH-64A and AH-64D flight crews to a potential EGI failure mode, describe the characteristics of this failure, and provide operational guidance to prevent mishap in the event of its occurrence. ATCOM contact: Mr. Howard Chilton, DSN 693-1587/2178 (314-263-1587/2178).

CH-47-97-ASAM-07, 141323Z Apr 97, maintenance mandatory.

The CH-47 is designed with two redundant three-phase 400 Hz ac electrical power distribution systems. The two systems are normally isolated and operate independently of each other. However, inherent cockpit water intrusion is subjecting CH-47D and MH-47D/E power distribution panels to water entry. Subsequent moisture and salt-water induced corrosion is causing a conductive path buildup that can lead to arcing, which results in a short circuit between phases. The purpose of this message is to outline procedures to deal with the problem. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

CH-47-97-ASAM-08, 221759Z Apr 97, maintenance mandatory.

TB 1-1520-240-20-77 was issued to have specific rod end bearings inspected and lubricated at the next phase and every first and third phases thereafter. Since this TB was issued, several bearings in the closet area have been identified as also requiring lubrication. The purpose of this message is to inform users of the requirement to inspect and lubricate rod end bearing grease fittings in the flight control closet area of CH-47D and MH-47D/E aircraft. ATCOM contact: Mr. Dave Scott, DSN 693-2045/2085 (314-263-2045/2085).

GEN-97-ASAM-04, 101430Z Apr 97, maintenance mandatory.

This message was transmitted in two parts. Its purpose is to provide consolidated and updated information on aviation NVG messages. It also lists current points of contact for NVG issues. This message is not intended to replace any publication, and it does not address NVGs used for ground operations. ATCOM contact: Mr. Bob Brock, DSN 693-1599 (314-263-1599).



The upcoming holiday is one we celebrate with enthusiasm, usually outdoors or away from home in various recreational activities. It would be particularly tragic for this uniquely American celebration to end in accidental death or injury. To reduce this possibility for yourself and your family, make the risk-management principles you practice at work your way of life off duty as well. Have a spectacular Fourth!

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Class A Accidents through April

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2ND QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2	2	7	1
3RD QTR	April	1	2	3	2
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
TOTAL		7	7	16	5

*Excludes 1 USAF pilot trainee fatality



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